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The Effects of Maternal Depression on  
Mother-Infant Interaction During Feeding Episodes  
and Infant Attachment Classification

By

Lynne A. Foss

A thesis submitted in partial fulfillment  
of the requirements for the degree of

Master of Nursing

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Abstract

The Effects of Maternal Depression on  
Maternal Infant Interaction during  
Feeding Episodes and Infant Attachment Classification

By Lynne Foss

Chairperson of the Supervisory Committee: Professor Kathryn Barnard  
Department of Nursing

This secondary investigation analyzed previously videotaped feeding episodes of mothers and their 8 and 13 month old infants. The purpose of this study was to compare the interactive styles of depressed and non depressed mothers and their infants. Women were placed in the appropriate group after being given the Schedule of Affective disorders and Schizophrenia. Additionally, the data from the 13 month feeding episodes were compared to the infants' attachment classification at 13 months. The Ainsworth Strange Situation was used to obtain the infant attachment classifications.

During this blinded study, the investigator scored sixty one feeding sessions with the Nursing Child Assessment Feeding Scale (NCAF). The mothers were scored on sensitivity to the infants' cues, response to distress, and fostering cognitive and social emotional development. The infants were scored on their clarity of cues and response to the caregiver's actions. Additionally, contingency scores were calculated for each subscale.

Thirty three of the feeding episodes were of depressed mothers and twenty eight were of non depressed mothers. These mothers were well educated and had an average

age of 31 years. Across the NCAF subscales and totals the depressed mothers and their infants scored better than the non depressed dyads in this sample. In the eight month feeding episodes, the depressed mothers scored significantly better than the non depressed mothers in the following subscales: response to distress, cognitive growth fostering, and caregiver total. In the 13 month feeding sessions, only the NCAF total score was significantly higher for the depressed mothers. Analysis of covariance using maternal age, employment, and education showed significant influence in the 8 month feeding episodes.

The frequency of secure attachment in the depressed and non depressed groups was 42.1 and 44.4 percent respectively. Infants of multiparous mothers in the non depressed group were more likely to be classified as insecure. However, in the depressed group the primiparous mothers were more likely to have infants classified as insecure.

The higher scores in the depressed group is certainly puzzling. However, the low frequency of secure attachment in the non depressed group is concerning. Information on the mothers' level of social support, life events during the past year, level of parenting stress, stability of their marital relationship, and potential for domestic violence may have clarified these results. Since many of these women are in professional occupations evaluating the mothers perceived loss of career status before and after the birth of the child may be critical here. Continued research comparing the interactive styles of well educated, mature, depressed and non depressed mothers will provide insight into the psychosocial needs of these groups of new mothers.

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## **Chapter I**

### **INTRODUCTION**

An infant's secure attachment to his mother appears to develop over time as the infant begins to feel safe in his dependency on his mother. This attachment is partly a function of the interactive style between the infant and the mother. The relationship between maternal-infant interaction during the first year of life and subsequent maternal-infant attachment is strongly supported through research done by Bowlby (1969) and Ainsworth (1978). Given that the infant has limited mobility and unique communication skills, the infant relies on the interaction between himself and his mother or primary caregiver to meet his needs. However, the importance of this interaction is not confined to the mother meeting her infant's immediate physical needs. In fact, early maternal-infant interaction affects the later cognitive (Beckwith, 1971; Beckwith, Cohen, Kopp, Parmelee, & Marcy, 1976; Bee et al. 1982; Coates & Lewis, 1984; Olson, Bates, & Bayles, 1984; Ramey, Farran, & Campbell, 1979) and social (Clarke-Stewart, Vanderstoep, & Killian, 1979; Lewis, Feiring, McGuffog, & Jaskir, 1984) development of the child.

Interaction between two people is influenced by behaviors and attitudes brought by each individual into the situation. Just as different infants react differently in similar situations, mothers have various abilities with regard to how they interact with their infants. Maternal emotional stress, such as depression, can affect a mother's ability to communicate with and understand her infant.

Approximately, 20-26 % of women experience major depression in their life time (Boyd & Weissman, 1981). Maternal depression has been identified as a risk factor for insecure attachment (Ainsworth, Blehar, Water, & Wall, 1978), child neglect (Gaudin, Polansky, Kilpaterick, & Shilton, 1993), child abuse (Scott, 1992), child psychopathology (Stott, Musick, Clark, & Cohler, 1983), and expressive language delay (Cox, Puckering, Pound, & Mills, 1987). Whiffen (1988) studied a sample of 115 women and found the risk factors for postpartum depression included developmentally inappropriate maternal expectations of the infant, prepartum depressed mood, maternal tension after birth, maternal cognitive impairment, and maternal perception of a difficult temperament in her infant. Low social support has also been identified as a risk factor for depression in the postpartum period (Cutrona & Troutman, 1990)

### **Problem Definition**

The prevalence of major depression in women is twice as high as in men (American Psychiatric Association, 1987). As many as 26% of all women will suffer from major depression at some point in their lives. The average age of onset for depression is in the late twenties during childbearing years. Left untreated symptoms can last six months or longer. Since precipitating factors, such as childbirth, divorce, marital separation, psychosocial stressors, and the death of a loved one, are common for young mothers, understanding the effects of depression on mother-infant interaction and subsequent development is critical for pediatric professionals.

Maternal depression is associated with an infant's development of emotional and behavioral disturbance and expressive language delay (Cox et al., 1987). When comparing

one year old infants of depressed and non depressed mothers, the infants of depressed mothers had lower mental and motor developmental scores. However, all levels of depression did not appear to have the same detrimental effects. There were mental and developmental score differences in infants of mildly depressed mothers versus severely depressed mothers. The attachment category of the infant was also influenced by the severity of depression. The infants whose mothers suffered mild depression had a higher likelihood of being securely attached. However, infants of mothers suffering from severe depression are at greater risk for insecure attachment (Radke-Yarrow, Cummings, Kuczynski, & Chapman, 1985). Unfortunately, even after the depressed episode abated, the children of depressed mothers demonstrated more disturbance than the control group did.

Klehr and colleagues (1983) studied feeding and play sessions between mothers and their infants comparing the interactive style of mentally ill and well mothers. The mentally ill mothers had one of the following disorders: schizophrenia, schizoaffective, affective, or character disorder. The researchers used a qualitative interactive tool which coded behaviors such as "tone of voice, mood, quality of affect, responsiveness, sensitivity, consistency, reciprocity, structuring the environment, and contingency" (p. 257). The two groups did not differ significantly in their interaction during structured and unstructured play situations. However, during feeding episodes the mentally ill mothers were less emotionally available, less reciprocal, and less positive. The feeding interaction may have required too many of the mothers' emotional resources and therefore, interactive deficits became apparent.

The quality of interaction between the mother and the infant is a significant determinant of attachment and developmental outcome. The mother's mental well being influences the quality of mother-infant interaction. Specifically, Klehr (1983) highlights the feeding episode as particularly difficult. Therefore, further understanding of feeding interactions using other feeding assessment tools is warranted.

### **Purpose of the Study**

The purpose of this study was to compare the mother-infant interaction style of unipolar depressed mothers with the mother-infant interaction style of non depressed mothers during feeding episodes at eight and thirteen months of age using the Nursing Child Assessment Feeding scale. The interactive style of the mothers during the thirteen month feeding episode was compared to the attachment classifications of the infants at thirteen months of age.

## **Chapter II**

### **LITERATURE REVIEW**

#### **Effects of Depression on Maternal-Infant Interaction**

The American Psychiatric Association (1994) defines major depression as experiencing a "loss of interest or pleasure in nearly all activities" (p. 320). The onset of symptoms may be gradual or sudden but they must persist for at least two weeks. A depressed individual may experience a decrease in energy, feelings of worthlessness, inappropriate guilt, difficulty concentrating and recurrent thoughts of death. Associated symptoms include changes in appetite, weight, or sleep patterns. Psychomotor agitation or retardation may also accompany depression. A major depression episode must be accompanied by a significant impairment in day to day social or occupational activities. Consequently, major depression influences how a mother interacts with society at large as well as with her children.

Maternal depression affects a mother's perception of her children and the interactive style of the dyad. Depressed women not only tend to view their children more negatively (Hall, Gurley, Sachs, & Kryscio, 1991; Lovejoy, 1991; Whiffen & Gotlib, 1989) but definite components of their interaction styles interfere with synchronous interaction (Gordon, Burge, Hammen, Adrian, Jaenicke, & Heroto, 1989; Cohn, Matrias, Tronick, Connell, & Lyons-Ruth, 1986; Livingood, Daen, Smith, 1983; Hoffman & Drotar, 1991; Fleming, Ruble, Flett, Shaul, 1988; Morriset, Barnard, Greenberg, Booth, & Spieker, 1990). Similarly, infants of depressed mothers demonstrate actions indicative of distress towards their depressed mothers (Cohn & Tronick, 1983; Field et al., 1985;

Hoffman & Drotar, 1991; Zekoski, O'Hara, & Wills, 1987) and a depressed affect to other adults (Field et al., 1988).

Depression in a mother influences the interaction between she and her children regardless of the children's ages. A study by Hall, Gurley, Sachs, and Kryscio (1991) suggests that depressive symptoms in the mother positively correlate with less favorable parenting attitudes and decreased quality of the mother-infant intimate relationship. Another study (Whiffen & Gotlib, 1989) reported that although depressed mothers did not identify their infants as temperamentally more difficult than did non depressed mothers, depressed mothers did perceive their infants as more "bothersome" and identified more difficulties with their care. In addition, Tamminen and Salmalin (1991) identified that depressed mothers interpreted their infants' reactions during a difficult feeding episode as rejection. Breastfeeding mothers who were identified as depressed prenatally were more idealistic but held more negative attitudes toward breastfeeding after their infants were born (Tamminen, 1988). When children are toddlers, depressed mothers recall more negative behaviors of their children in a structured play situation than did non depressed mothers (Lovejoy, 1991). Depressed mothers of school aged children with behavioral disorders are more likely to be critical and use spanking for discipline (Webster-Stratton & Hammond, 1988).

When focusing on infancy, the interaction between the mother and the infant is affected by specific behaviors demonstrated by the depressed mother. Depressed mothers can demonstrate a depressed, tense facial appearance, less gameplaying, fewer contingent responses, and less imitative behaviors (Field et al., 1985). In addition, depressed mothers



tend to gaze less often at their infants, offer less unconditional positive regard, and exhibit a more disruptive rocking motion with their infants (Livingood, Daen, & Smith, 1983). These mothers are also less sensitive to their baby's needs and cues (Tamminan & Salmalin, 1991), less emotionally available to their infant, and less accepting of their infant's behavior (Hoffman & Drotar, 1991).

Interaction in a dyad is dependent on the behavior of both participants. Therefore, it is not surprising that researchers have found less mutual responsiveness and turn-taking in dyads where the mother is depressed (Cohn, Matrias, Tronick, Connell, & Lyons-Ruth, 1986; Zekoski, O'Hara, & Wills, 1987; Hoffman & Drotar, 1991). In general, infants of depressed mothers tend to have less positive, less engaging, and less contingent behaviors and fewer easy to read cues (Hoffman & Drotar, 1991). During another study (Zebroski, O'Hara, & Wills, 1987), infants of depressed mothers were less responsive to their mothers even when the mother was attempting to elicit positive behavior. Although infants of depressed mothers performed more poorly in face to face playful interaction with a stranger than did infants of non-depressed mother, they demonstrated more head and gaze aversion with their mothers than with the stranger (Field et al., 1988).

Even mild depression in mothers during early infancy can predispose the dyad to problems. Punitive controlling attitudes toward childrearing were more prevalent in depressed mothers. Mild depression can be associated with reduced maternal feelings, less affectionate behavior, and reduced feelings of maternal adequacy (Fleming et al., 1988). At 18 months, infants of previously depressed mothers were less securely attached and had

mild behavioral difficulties. However, cognitive and language development did not appear to be affected (Murray, 1992).

Maternal depression is a risk factor for developing an asynchronous pattern of interaction between a mother and her infant. Unfortunately, this interactive style puts the infant at increased risk for insecure attachment, lower IQ and language score, and possible behavioral problems later in life.

### **Maternal-Infant Interaction**

Maternal-infant interaction has been documented as an essential component in maternal-infant attachment. Brazelton (1963) recognized how the behaviors of one individual in the mother-infant dyad influences the behaviors of the other. Lester, Hoffman, and Brazelton (1985) documented rhythmic cycles of interaction between infants at 3 and 5 months of age and their mothers. Although these cycles were observed across individuals, the stronger the dyad's rhythm the easier it was for the adult to read and respond to the infant. Barnard (1989) labeled this reciprocal interaction a "dance" between two individuals. Specific behaviors of the parent and the infant encourage the process of interaction to continue (Barnard et al. 1989; Beckwith, 1972; Blehar, Lieberman, & Ainsworth, 1977). An infant at the earliest age appears to respond to speech behaviors of adults (Condon & Sander, 1974) and exhibits turn taking during the suck pause jiggle sequence of feeding (Kaye & Wells, 1980). Each member of the dyad needs to be sensitive and responsive to the other's cues. Ideally, the interactive style of the parent promotes the cognitive and social growth and well-being of the infant. The quality

and timing of the interactive behaviors of both parties affects the quality mother-infant attachment.

Interactive patterns between a mother and her infant are labeled as synchronous or asynchronous (Barnard et al., 1989). During synchronous interaction, the mother is able to identify the needs of the infant and respond appropriately. She can read the infants signals which are designed to promote or discontinue the interaction. The infant is able to send out readable cues and respond to the mother. For example, when the infant is awake and alert, the mother begins to talk and smile at her infant. In response, the infant looks at his mother and smiles back. During synchronous interaction the mother provides appropriate cognitive stimulation for the infant. Conversely, during asynchronous interaction the mother is defined as too distant or intrusive. One example of intrusiveness is a mother attempting to play with her drowsy, inattentive infant. Another example of asynchronous interaction is a mother failing to play or respond to her infant who is wake, smiling, and cooing. The mother may inappropriately inhibit or over stimulate the infant which, in turn, can affect the infant's cognitive and social growth.

The purpose of interaction between an infant and a parent is not only to meet the physical needs of the infant but the psychological ones as well. During a research study, Beckwith (1972) observed interaction with the mother and infant during spontaneous activity. Although the sample size was small, the results from this study suggest that the quality of the mother's responsiveness to the infant's cues was a determinant in the infant's social behavior. For example, the more the mother ignored the infant the less he was oriented to her and the less he maintained contact. Even if the ignoring occurred during

episodes of high infant crying, the infant appeared less responsive during subsequent social play with the mother. Additionally, when an infant experienced ignoring from his mother, the infant was more responsive to a stranger.

Although there is no definitive evidence concluding which individual in the mother-infant dyad contributes more to the interactive process, it is fairly safe to say the mother plays the greater role in determining and adapting to individual differences. Security in an infant appears to be fostered by sensitive maternal care which does not include either too much or too little stimulation (Belsky, Rovine, & Taylor, 1984). Research suggests that insecure attachment is the result of extremes in the mother's behavior. Secure attachment appears to be characterized by moderation in behavior. Infants who are classified as secure experience a disproportionate amount of synchronous interaction with their mother. Insecure infants experience a disproportionate amount of asynchronous interaction (Isabella & Belsky, 1991).

### **Interaction and Subsequent Development**

The results of mother-infant interaction have documented far reaching effects. Importantly, it is not the amount of stimulation that appears to be essential in future cognitive development but the amount of maternal responsiveness and the type of interaction style (Lewis & Coates, 1980). In other words, a synchronous interactive style promotes positive social and cognitive development where as an asynchronous style promotes deficits in this development. Although there are a few studies that negate (Bakeman & Brown, 1980) the influence of maternal interaction on a child's later social and cognitive development, most studies support this hypothesis. For example, if the

infant's experiences are limited by a combination of a restrictive environment and few contacts with his mother, the infant's intellectual performance can be diminished (Beckwith, 1971). Another study (Beckwith, Cohen, Kopp, Parmelee, & Marcy, 1976) found increased sensorimotor performance at nine months and a greater level of social interaction at eight months were significantly related to higher frequency of mutual gazing, interchanges of smiling during those gazes, and contingency responses when the infant was in distress.

Maternal-infant interaction behaviors in a group of high risk African American families were divided into various categories then scored on frequency and duration. The mother-infant interactions were videotaped at home and scored at six and twenty months of age. Here again, the results support the hypothesis positively correlating effective maternal-infant interactions with increase intelligence quotients (IQ) score on the Stanford-Binet test (Ramey, Farran, & Campbell, 1979).

Clark-Stewart, Vanderstoep, & Killian (1979) found an infant's intelligence more closely related to the mother's interactive style than to the mother's intelligence. Cognition, language, and social relations were intercorrelated and found to be associated with a cluster of stimulating interactive maternal behaviors. For example, descriptive speech, positive play, nondirectiveness, and nonrestrictiveness appeared to enhance later IQ scores.

A longitudinal study done at the University of Washington (Bee et al. 1982) examined perinatal status, child performance, family characteristics, and mother-infant interaction as predictors of Intelligence Quotient (IQ) and language skill. A group of 193

primiparous mothers and their infants were followed from birth to four years. A battery of tests were used to assess the children's development including the Bayley Mental Development Inventory, Binet IQ test, Denver motor score, and receptive and expressive language tests. Interactive style and general environmental assessment tools were used to help define the relationship between mother-infant/child interaction and environment to developmental outcomes. The study supported the hypotheses relating the quality of mother-infant interaction and the environment during the first year of life as the best predictors of later IQ and language performance after two years of age.

Other studies have produced similar results as the Bee study. Coates and Lewis (1984) correlated school achievement at six years with maternal interaction styles, not intelligence scores, from infancy. This study had a smaller sample than the previous one but the results were significant. Research conducted by Morriset, Barnard, Greenberg, Booth, & Spieker (1990) identified interactive style at one year of age as a stronger predictor of child outcome than social status, mother's life stress, social or psychological functioning.

The effect of maternal interaction on the psychological well-being of an infant is well documented. Specifically, styles of feeding interaction in the first year of life and the teaching interaction in later years are indicators of future child development (Sumner & Spietz, 1994). A synchronous interactive style promoting social and cognitive development influences not only attachment to the infant's mother but also social and cognitive functioning during school age. However, mother-infant interaction is influenced by the psychological well-being of the mother. Consequently, further understanding of the

influences of depression on the maternal-infant interaction during feeding episodes remains clinically significant.

### **Attachment**

Development of attachment is associated with the interactive style between the mother and her infant and the emotional well-being of the mother. For example, face to face interaction (Blehar, Lieberman, & Ainsworth, 1977) and contingency responses (Smith & Pederson, 1988) between the two individuals has been shown to be critical in enhancing attachment. In secure attachment, the infant demonstrates positive affect toward the mother, seeks her bodily contact after separation, and uses her as a secure base to explore the surrounding environment. Insecure attachment was originally divided into two types: avoidant and resistant. In both of these types, the children display separation anxiety, lack of confidence in the mother's physical and emotional accessibility, and do not use her as a secure base from which to explore the surrounding area (Ainsworth et al., 1978). A third type of insecure attachment, disorganized/disoriented, was identified by Main and Soloman (1986). Infants in this classification demonstrate incomplete or disorganized strategies to elicit comfort from the mother.

A study by Blehar, Lieberman, and Ainsworth (1977) observed twenty six dyads in their homes in three week intervals from 3 to 54 weeks of age. The Ainsworth Strange Situation assessment tool was used at twelve months to measure attachment. Infants who were securely attached were more likely to have mothers who engaged in face to face interaction and were more playful and lively. Insecure infants had mothers who were more likely to initiate interaction with a silent, impassive face and fail to respond to their

infants interactive attempts. Moreover, these mothers were less likely to evoke a positive response out of their infants.

Isabella, Belsky, & VonEye (1989) documented that synchronous maternal-infant interaction in the first year of life was critical for secure attachment at one year of age. Mothers of secure infants were more responsive than expected to their infants vocalizations when observed at one, three, and nine months. At nine months secure infants exhibited complex turn taking. In infants classified as insecure-avoidant, the mother appeared to vocalize without regard to what the infant was doing and she rarely responded to the infants vocalization efforts. In the insecure-resistant classification group there were relatively few mutual or reciprocal behaviors. Other studies have documented similar results supporting the importance of reciprocity instead of amount of interaction (Lewis & Feiring, 1989; Smith & Pederson, 1988)

Mothers of infants who are securely attachment experience less negative and more positive emotion. In addition, they are able to express negative emotion openly in front of their children. Conversely, mothers of insecurely attached infants reported they felt more negative emotions and were not likely to express them in front of their children (Izard, Haynes, Chisholm, & Baak, 1991).

Interestingly, there is some documentation indicating little difference in the amount of affectionate behavior experienced by securely attached and insecurely attached infants. However, the types of affectionate acts do differ. For example, securely attached infants experience more hugging and cuddling than insecure-avoidant infants. This may result in less body contact for the insecure avoidant infant (Tracy & Ainsworth, 1981).



Egeland and Farber (1984) assessed mother-infant attachment of high risk infants at twelve and eighteen months of age with the Ainsworth Strange Situation. They found mother-infant attachment at twelve months to be unstable. Some children who were classified as secure at twelve months were classified as insecure-avoidant at eighteen months. Mothers of these children scored higher on aggression and suspicion scales and lower on social desirability scales. The change in attachment category can also be attributed to increases in the mother's life stresses. For example, more mothers of infants who had changed from secure to insecure had stopped living with their boyfriends. Therefore, this suggests that not only is mother-infant interaction important but life circumstances also play a role in the formation of attachment.

A study which assessed 113 children at twelve months for attachment followed up at six years of age with the mothers filling out a child behavior profile (Lewis, Feiring, McGuffog, & Jaskir 1984). The results indicated boys who are securely attached at twelve months exhibit fewer behavioral problems at six years of age. Forty percent of insecure males show signs of behavioral difficulty and psychopathology. Unfortunately, attachment classification in girls was not a predictor of behavioral outcomes at age six. Therefore, it appears that secure attachment in boys may serve as a protectant against behavioral difficulty in early school years.

The incidence of insecure attachment in infants of mildly depressed mother is comparable to the normal population (Radke-Yarrow et al., 1985). However, major depression can influence attachment classification. Ninety-nine children of mothers diagnosed with bipolar depression, unipolar depression, mild depression, or no affective

disorder were assessed for attachment classification. Fifty-five percent of all the infants in families with major affect disorders were insecurely attached. In families with bipolar depression the number of insecurely attached infants rose to 70%. It appears that maternal depression is a greater factor in attachment issues with infants than paternal depression. If both parents were depressed, the infants did not appear at any higher risk for attachment problems than if only the mother was depressed. However, if children of depressed mothers lacked the presence of a father, they were at higher risk for insecure attachment when compared to other children of depressed mothers who had a father present.

Overall, research strongly supports and identifies specific behavioral patterns that promote attachment between a mother and her infant. Although the first 12 months of life appear critical, there is some evidence that the mother's life circumstances can influence a change in attachment category from secure to insecure after this time period. Regardless of when insecure attachment occurs, it appears to influence the behavioral outcomes of children far beyond infancy.

### **Theoretical Framework**

A mother suffering from major depression experiences numerous symptoms that impede on the interaction between her and her infant. The mother's inability to control her feelings of worthlessness and guilt results in either emotional withdrawal or intrusiveness. In either situation, the mother does not read or respond to her infant's cues and communication attempts. The infant's first experiences regarding communication style,

attachment, security, and learning are tightly woven into the environment created by the mother's illness. Consequently, the infant learns not to depend on his mother to meet his psychological and physical needs. These initial exposures influence the infant's future social and cognitive development. In other words, the mother-infant interaction cannot be separated from the context of the environment. Therefore, child development results from the interaction between the mother, infant, and environment. Figure 1.

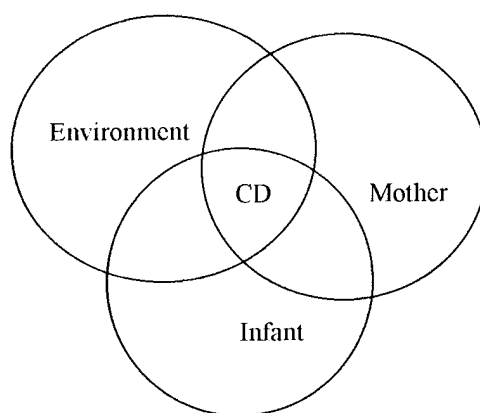


Figure 1. From “An Ecological Paradigm for Assessment and Intervention” by Barnard, Eyres, Lobo, and Snyder in T. B. Brazelton and B. M. Barry’s (Eds.), 1983, New Approaches to Developmental Screening of Infants, p. 206. CD= Child Development. Reprinted by permission.

Maternal social support, depression, socioeconomic status, neighborhood, and education level are all examples of environment and can affect maternal psychological and physical availability. Normally, all the mentioned aspects of environment would be assessed when considering environment. Instead of considering this multi dimensional

view of the mother-infant interaction, this study separates a unidimensional slice of this model. Mother-infant interaction and attachment are studied in the context of maternal depression. Figure 2.

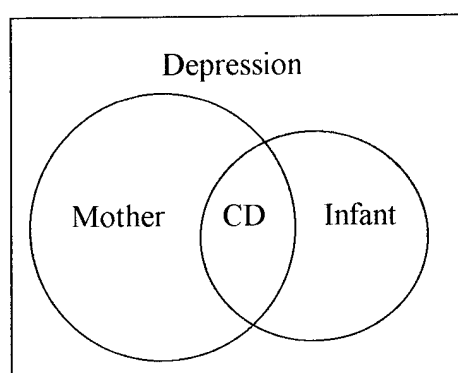


Figure 2. This study looks at mother-infant interaction within the context of maternal depression. CD = Child Development.

The Nursing Child Assessment Project developed tools to assess maternal-infant feeding and teaching interactions (Barnard et al, 1989). The Nursing Child Assessment Feeding scale (NCAF) identifies skills needed by both the mother and the infant to promote mutual regulation during a feeding episode. Specifically, the mother is scored on her ability to be sensitive to the infant's cues, alleviate distress, and provide social-emotional and cognitive growth fostering. The infant is scored on the ability to give clear cues to the mother and to respond to the mother's attempt to communicate. In this study, maternal-infant interaction is defined by these behaviors.

The behaviors outlined for each member of the dyad promote the continuation and mutual regulation of the interactive pattern. If individuals recognize and accommodate the

needs of each other, the interaction is labeled as synchronous and provides a responsive and mutually satisfying experience. On the other hand, if cues are not read or responded to, the interactive process is labeled as asynchronous and may result in a rigid, dissatisfying experience. Current research offers strong evidence that asynchronous maternal-infant interaction places the child at higher risk for insecure attachment and inadequate social and academic skills later in life.

The interrelationship between the mother, infant, and environment provides a pediatric health care provider with a three dimensional assessment of child development. However, to gain an accurate understanding of the impact of different environmental influences, mother-infant interaction needs to be studied within the context of the specific environmental situations. Therefore, this study will examine interaction styles of depressed and non depressed mothers and their infants. A comparison of these interactive styles with the infants' attachment classifications will also be done.

## **Chapter III**

### **METHODOLOGY**

The purpose of this research was to study the effects of maternal unipolar depression on mother-infant interaction during a feeding episode and on the infant's attachment classification at thirteen months of age. This investigator had the opportunity to do a secondary analysis of data collected at the National Institute of Mental Health (NIMH) on which Dr. Radke-Yarrow, NIMH, and Dr. Kathryn Barnard, University of Washington, were collaborating. The feeding sessions were divided into two groups: those mothers suffering from unipolar depression and those without known psychopathology. After the feeding episodes were scored, the NCAF total feeding score was compared to the infants' attachment classification.

#### **Hypotheses**

The following hypotheses were tested in this study.

##### Hypothesis 1

Depressed mothers will score lower on sensitivity to cues, social-emotional growth fostering, and cognitive growth fostering.

##### Hypothesis 2

There will no significant difference in the infant NCAF scores between infants' of depressed and non depressed mothers.

##### Hypothesis 3

There will be no significant difference in the dyad NCAF scores between eight and thirteen months of age within the depressed and non depressed groups.

#### Hypothesis 4

Infants of depressed mothers with contingency scores below the mean will have insecure attachment classifications.

#### Hypothesis 5

Sons of depressed mothers with contingency scores below the mean will be more likely than daughters of depressed mothers with contingency scores below the mean to be classified as insecure.

### **Population and Sample**

The original research team recruited mother infant dyads from the Washington DC area. The infant's ages in these dyads were eight and thirteen months. After using the Schedule for Affective Disorders and Schizophrenia (SADS), the investigators placed the mothers into the unipolar depression or the control group. Sixty-one feeding episodes were videotaped at NIMH and were available for scoring for this secondary analysis. Some of the same mother infant dyads were available for both the eight and thirteen month feeding episodes. Other dyads participated in only one of the feeding episodes. The infants' attachment classifications were coded by an individual trained in the ABCDU classification system. The infants were thirteen months of age when the strange situation was enacted and video recorded.

### **Secondary Analysis**

The nurse investigator for the secondary analysis was blind to the mothers' mental health status and the infants' attachment classification when scoring the feeding interactions at eight and thirteen months. After all the feeding episodes were completely

scored, the mothers' mental health status and infants' attachment classification were revealed. At this time a comparison was done of the depressed and control groups.

### **Assessment Tools**

#### The Schedule for Affective Disorders and Schizophrenia

The SADS was used to obtain a clinical rating of depressive symptomatology of the participants before they were assigned to the depressive and control groups. This was administered by professionals trained at using this tool. The SADS features different symptom scales. The psychometric properties for Depressive mood and ideation and Depressive-associated symptoms scales will be considered here. The internal consistencies for Depressive mood and ideation and the Depressive-associated symptoms scales have been reported elsewhere as Cronbach alpha's of .87 and .79 respectively. The test-retest reliability coefficient for the Depressive mood and ideation was .78. For the Depressive-associated features scale the test-retest reliability coefficient was .88. The reliability of two trained observers rating the same interview was .95 for Depressive mood and ideation and .96 for Depressive-associated symptoms (Endicott & Spitzer, 1978)

#### The Nursing Child Assessment Feeding Scale (Appendix A)

The feeding situation provides a familiar rehearsed situation through which professionals can observe the mother-infant interactive style. The Nursing Child Assessment Feeding (NCAF) Scale was developed by Barnard in 1979 and is divided into subscales which items score specific behaviors. The mother is scored on being sensitive to the infant's cues, alleviating the infant's distress, and fostering cognitive and social-emotional development. The infant's score is based on the ability to produce clear cues



and respond to the caregiver's actions. NCAF is a binary assessment tools containing 76 items and is applicable until an infant is approximately thirteen months of age. The tool indicates whether a particular behavior has occurred, however it does not note the frequency of a behavior.

All professionals using the NCAF tool must achieve an 85% reliability before certification to use the tool in clinical or research application is granted. The internal consistency reliabilities for the feeding scales items using Cronbach's alphas are reported as total parent score .83, total child score .73, and the combined total score .86. Some of the subscales do not display such a strong internal consistency, however, the high total scores are evidence that the entire interactive process is being assessed. The test-retest reliability coefficient reflected stability over the first year of life. The total parent score was .75 and the total infant score was .51. Both types of reliability demonstrate a greater stability in regards to the mother's score (Barnard et al, 1989).

The NCAF scales appears to have predictive validity. One study compared the feeding scores from one, four, eight , and twelve months to the Bayley Mental Index at twelve and twenty four months, expressive and receptive language at thirty six months and the Binet Intelligence Quotient (IQ) at forty eight months. The data demonstrated a tendency toward feeding scores predicting the outcomes of these other developmental measures tools. However, the small sample size limited the correlations from reaching acceptable levels of significance on a sample size less than 30 (Barnard, 1994).

The individuals in the dyad can possess specific attributes that can influence the feeding score. Mothers who are older, married, or more educated tend to have higher

NCAF scores. Younger infants tend to score lower on the scales and this is particularly true of infants younger than twelve months of age (Barnard, 1978).

Intrarater reliability: After all the videotapes were scored with the NCAST feeding tool, the investigator rescored 29.5% of the tapes. The intrarater reliability was 93%.

#### The Ainsworth Strange Situation

The Ainsworth Strange Situation measures the incidence and frequency of specific behaviors as infants interact with their mothers. Classification of the infant is given according to the infant's behavior. When scoring interactive behaviors the researcher will observe six behavioral variables. These include proximity and contact seeking, contact maintaining, resistance, avoidance, search, and distance interaction. Interrater reliability between two trained scorers is as follows: proximity and contact seeking behaviors, .93; contact maintaining, .97; resistance, .96; avoidance, .93; and search, .94 (Ainsworth et al., 1978).

The attachment classifications given by this tool are group A, insecure-avoidant; group B, secure; group C, insecure-resistant; and group D, insecure disorganized/disoriented. The infants in group A avoid proximity to or interaction with their mothers in the reunion sessions. The infants in group B want proximity and contact with their mothers on reunion. In group C, the infants show some proximity seeking behaviors but resist interaction when it occurs. Incomplete or interrupted strategies for promoting comfort are demonstrated by infants in group D.

The Ainsworth Strange Situation was arranged and filmed by the original researchers. The coding was done by a researcher in another location who was trained in

the ABCD and unclassifiable criteria. The layout for the videotaped segments were clearly outlined and followed the standard Strange Situation procedure. During the first two minutes of the session, the baby and mother enter the room and the baby is placed on the floor facing toys while the mother reads. During the next six minutes the mother and baby are involved in free play. The stranger comes in the room for the next seven minutes. These seven minutes are divided into short segments: The stranger talks to the mother (1 minute), the stranger approaches the baby (1 minute), the stranger contacts the baby (1 minute), the baby is given a new toy and the stranger talks to the mother (3 minutes), and finally the stranger plays with the baby on the floor (1 minute). The next three minutes involve the first separation of the mother and the infant with the stranger still present. A reunion of the mother and infant occurs in the next three minute segment. Next, the second separation occurs and the infant is left alone for three minutes, The stranger returns for three minutes. Finally, the second reunion between the mother and the infant occurs for three minutes. The videotapes were scored after the entire situation was finished.

### **Data Analysis**

The data obtained from the original researchers and from coding the feeding tapes with the NCAF scale were analyzed with the statistical program SPSS for Windows Release 6.0 (1993). The following t-tests were used: one tailed, two tailed, and paired. Analysis of variance was used to identify influences of population characteristics on the results from the depressed and non depressed groups. The nonparametric test, chi square, was used to determine if the frequency of women working outside the home was

significantly different than expected.

The scores from the depressed and non depressed groups for the parent subscales of the NCAF scale were compared by using the one tailed t-test for independent sample. The two tailed t-test for independent samples was used to compare the scores from the infant subscales. The eight and thirteen month feeding episodes were analyzed separately within the depressed and non depressed groups. However, data from the dyads participating in both age classifications were additionally analyzed using the paired t-test. The data from each subscale, as well as the total NCAF score, total infant score, and total mother score, were analyzed. The level of  $< 0.05$  was used to evaluate the relevance of the t-value.

To account for the impact of maternal age, employment, and education on the NCAF scores, ANOVA tests were run on the subscales, total NCAF score, total infant score, and total mother score. The significance level was maintained at a p value of  $< 0.05$ .

Frequencies of secure and insecure attachment was calculated for the depressed and non depressed groups. Five attachment categories were used: A, B, C, D, and U. Classification A is for insecure avoidant children. Classification B is for secure children. Insecure resistant children were placed in classification C. Children scored as disorganized/disoriented were placed in classification D. Finally, those children who were unclassifiable were placed in classification U. The size of the sample in this study required that all categories of insecure attachment, including the U classification, be analyzed as one group.

## **Chapter IV**

### **FINDINGS**

The description of the sample characteristics is followed by the results of the data analysis. The depressed and non depressed feeding groups were analyzed within age groups except when discussing the stability of the coding tool over time. Then, the scores of the feeding tool are compared within the depressed and non depressed groups.

#### **Sample Characteristics**

Of the 61 dyads coded with the NCAF scale, 33 were in the depressed group and 28 were in the non depressed group. These groups were divided into eight and thirteen month feeding episodes.

#### **Infants' characteristics**

Of the 33 dyads in the depressed group there were 14 eight month and 19 thirteen month feeding episodes. In the depressed group, 9 of the 14 infants in the eight month cohort and 13 out of the 19 infants in the thirteen month cohort were males. Leaving a gender distribution of males at 64.3% and 68.4% for each age respectively. The non depressed group had 10 and 18 feeding episodes at the eight and thirteen month cohorts respectively. In the non depressed group, 5 out of 10, 50%, of the infants in the eight month cohort and 10 out of 18, 55.6%, of the infants in the thirteen month cohort were males. Table 1.

**Table 1. Distribution of age and gender in the infants**

Variable	Depressed Group n=33		Non Depressed Group n=28	
	8 month	13 month	8 month	13 month
Frequency of age	14	19	10	18
Number of males	9 (64.3%)	13 (68.4%)	5 (50%)	10 (55.6%)

**Mothers' characteristics**

The demographic information regarding the mothers showed no significant difference between the depressed and non depressed groups in education and age. The average years of education for the depressed mothers in the eight month and the thirteen month feeding cohorts was 15.9 and 16.1 respectively. The average maternal age was approximately 31 years for both groups. In the non depressed group, the average education level was 16.9 years for the mother's of the eight month cohort and 15.7 years for mothers of the thirteen month old infants. Again, there was no difference in the ages of the non depressed mothers in the different cohorts. Table 2.

**Table 2. Distribution of age and education in the mothers**

Variable	Depressed Group n=33				Non Depressed Group n=28*			
	8 month n=14		13 month n=19		8 month n=10		13 month n=15	
	Years	SD	Years	SD	Years	SD	Years	SD
Education	15.9	3.2	16.1	2.8	16.9	1.9	15.7	2.0
Age	31.4	5.9	31.3	5.1	31**	5.2	31.7***	5.9

\*data is missing

\*\* n=9; \*\*\*n=14

The career status of the mothers did vary in the groups. When considering both age cohorts in the depressed group, 42% of mothers reported working outside the home.

Almost half of the depressed mothers of the thirteen month old infants had jobs outside the home: 10 out of 19 mothers or 47%. In the non depressed group, 16% of the mothers reported a job. The lowest frequency of mothers working outside the home was found in the non depressed mothers of thirteen month of infants. In this group, data was available on 15 mothers and 13% of them reporting working outside the home. A chi square test was run to determine if the frequency of mothers working outside the home in this group differed significantly than expected. The results indicated  $X^2 = 12.3$  and this had a significance level of .002. In the eight month old infants, 35.7% of the depressed mothers were working outside the home while only 20% of the control reported doing the same ( $X^2 = 3.6$ , significance level = .06). Table 3.

**Table 3. Distribution of mothers working outside the home**

Variable	Depressed Group n=33		Non Depressed Group n=28*	
	8 month n=14	13 month n=19	8 month n=10	13 month n=15
Working	5	9	2	2
Not Working	9	10	8	13

\*three mothers with missing data

When considering all 61 mothers, 35 were primiparous. Of the eight month old feeding episodes, 10 out of 14 in the depressed and 4 out of 10 in the non depressed group were first time mothers. In the thirteen month old feeding episodes, 14 out of 19 in the depressed and 7 out of 13 in the non depressed mothers were primiparous.

In addition, all the mothers and infants were Caucasian except for one dyad which was African American.

### **Comparison of the NCAF Subscales in the Depressed and Non Depressed Groups**

The following section will compare the NCAF subscale scores and the total scores for the mother, infant, and NCAF tool. The mother is assessed by the following subscales: sensitivity to cues, response to distress, social emotional growth fostering, and cognitive growth fostering. The subscales clarity of cues and response to caregiver are used to assess the infant. Totals for each of the subscales are added together to give the mother or infant a total score. These totals are combined to give an overall NCAF score.

**Hypothesis 1:** *Depressed mothers will score lower on sensitivity to cues, social emotional growth fostering and cognitive growth fostering.*

Analysis of the mothers' scores in both cohorts was done using the one tailed t-test with a 0.05 significance level in accordance with testing a directional hypothesis of the depressed mothers scoring lower.

#### **Feeding episodes at eight months**

**The Parent:** When comparing the depressed and non depressed groups, there were no significant differences in the parent subscale scores for sensitivity to cues, and social emotional growth fostering. Significant differences were found in the cognitive growth fostering and response to distress subscales. In the cognitive growth fostering scale, depressed mothers scored higher with a mean score of 8.4 compared to the mean score of 7.3 for the non depressed group ( $t = 2.6, p < .01$ ). Additionally, the depressed mothers scored 9.0 on the response to distress scale while the non depressed mothers scored 7.9 ( $t = 1.9, p < .03$ ). The overall caregiver total for depressed mothers was significantly different between the groups ( $t = 1.8, p < .04$ ). Table 4.



**Table 4. Comparison of the parent subscales and total scores in the 8 month feeding episode between depressed and non depressed groups**

Variables	Depressed		8 month n=24 Non Depressed		t value
	Mean	SD	Mean	SD	
Sensitivity to cues	11.4	1.7	10.8	1.9	.70
Response to distress	9.0	1.3	7.9	1.5	1.9*
Social emotional growth fostering	12.0	1.2	12.0	1.5	.00
Cognitive growth fostering	8.4	.94	7.3	1.1	2.6*
Caregiver total	40.7	3.6	38.0	3.9	1.8*

\*significant at  $<.05$

An analysis of variance demonstrated that maternal age (significance of  $f = .05$ ) and education (significance of  $f = .01$ ) appeared to partially influence the cognitive growth fostering subscale. However, depression had the greatest influence.

**NCAF total:** The depressed and non depressed group showed no significant difference in the total NCAF score. Table 5. Analysis of covariance demonstrated that the NCAF total score was not influenced by maternal education and age.

**Table 5. Comparison of the NCAF totals between the depressed and non depressed groups during the 8 month feeding episode.**

Variable	Depressed		8 month feeding episode n=24 Non Depressed		t value
	Mean	SD	Mean	SD	
NCAF Total	61.8	4.8	58.4	6.3	1.4

### **Thirteen month feeding episodes**

**The Parent:** There were no significant differences between the depressed and non depressed groups in any of the parent subscales. However, there was a significant

difference in the parent total score between the depressed and non depressed groups (  $t = 1.6, p < .05$ ). Table 6.

**Table 6. Comparison of parent subscale and total scores between depressed and non depressed mothers at 13 months**

NCAF subscales	13 month feeding episode n=37				t value
	Depressed		Non Depressed		
	Mean	SD	Mean	SD	
Sensitivity to cues	11.9	2.1	11.4	2.0	.75
Response to distress	8.5	1.7	7.7	2.3	1.2
Social emotional growth fostering	12.7	1.4	11.7	2.5	1.6
Cognitive growth fostering	8.3	1.2	8.1	1.3	.66
Caregiver total	41.5	5.0	38.3	6.8	1.6*

\* significance at  $< 0.05$

A one way analysis of variance was done to consider the affect of maternal education and age on the parent subscales, no significant effect was found for either variable.

**NCAF total:** The one tailed t-test for independent sample did not show a significant difference between the NCAF total score for the depressed and non depressed group. Table 7. An analysis of variance found there was no significant influence of maternal age and education on the 13 month NCAF total score.

**Table 7. Comparison of the NCAF total score at 13 months**

Variable	13 month feeding episode n=37				t value
	Depressed		Non Depressed		
	Mean	SD	Mean	SD	
NCAF total	63.5	8.2	59.5	8.6	1.4

**Hypothesis 2:** *There will be no significant difference in the infant NCAF scores between infants of depressed and non depressed mothers.*

Analysis of infant scores in both cohorts was done using the two tailed t-test with a significant of  $< .05$ .

### **Feeding episodes at eight months**

*The Infant:* When comparing the infant subscales at the 8 month feeding, there were no significant differences between the mean scores for the depressed and non depressed groups. Similarly, the infant total score was essentially the same in both groups. Table 8.

**Table 8.** *Comparison of depressed and non depressed group infant subscale and total scores during the 8 month feeding episode.*

NCAF subscale	Depressed		8 month n=24 Non Depressed		t-value
	Mean	SD	Mean	SD	
Clarity of cues	13.2	.90	13.2	2.0	.02
Responsiveness to caregiver	7.6	1.2	7.2	1.0	.93
Infant Total	20.9	1.8	20.4	2.8	.48

An analysis of variance considering maternal age and education indicated that neither of these variables had a significant impact on the infant subscale results.

### **Feeding episodes at thirteen months**

*The Infant:* Analysis of data from the 13 month feeding episode produced no significant differences in the of infant subscale scores or the infant total score between the depressed and non depressed groups. Table 9.

**Table 9. Comparison of the infant subscale and total scores during the 13 month feeding**

NCAF subscales	13 month feeding episode n=37				t value
	Depressed		Non Depressed		
	Mean	SD	Mean	SD	
Clarity of cues	14.5	.77	13.9	1.4	1.6
Responsiveness to caregiver	7.7	1.2	7.2	1.2	1.3
Infant total	22.7	2.6	21.2	2.5	1.9

When considering the effect of maternal education and age on the infant mean score, a one way analysis of variance did not demonstrate significant influence from these variables.

#### **Comparison of NCAF Scores by Age within Depressed and Non Depressed Groups**

**Hypothesis 3:** *There will be no significant difference in the dyad NCAF scores between eight and thirteen months of age with in the depressed and non depressed groups.*

This part of the analysis used the paired t-test to compare the subscale scores of the eight and thirteen month cohorts within the depressed and non depressed groups. Only scores from dyads participating in both episodes were used in the analysis.

#### **The depressed group**

**Parent subscales:** No significant differences were found in the parent subscales between the eight and thirteen month feeding episodes. However, the mean scores in the response to distress and cognitive growth fostering subscales went down. Similarly, the difference in the parent total scores did not produce a significant difference. Table 10.

**Table 10: Comparison of parent subscale and total score in the depressed group**

NCAF subscales	Depressed Group n=11				
	8 month		13 month		t value
	Mean	SD	Mean	SD	
Sensitivity to cues	11.6	2.0	12.2	2.2	.69
Response to distress	9.0	1.4	8.5	2.2	1.1
Social emotional growth fostering	12.2	1.3	12.6	1.5	1.24
Cognitive growth fostering	8.6	0.7	8.0	1.4	1.6
Parent total	41.5	3.4	41.4	6.1	.06

**Infant subscales:** The mean scores for the clarity of cues subscales did show a significant difference between the eight and thirteen month feeding episodes in the depressed group. The mean scores were 13.3 and 14.5 respectively ( $t = 4.2, p < 0.01$ ). Additionally, the mean scores of responsiveness to caregiver went down at thirteen months, however, this difference was not statistically significant. The difference in the total infant score between the age groups also was not significant. Table 11.

**Table 11. Comparison of the infant subscales and total in the depressed group**

NCAF subscales	Depressed group n=11				
	8 month		13 month		t value
	Mean	SD	Mean	SD	
Clarity of cues	13.3	.91	14.6	.52	4.2*
Responsiveness to caregiver	8.0	1.0	7.5	1.2	1.9
Infant total score	21.3	1.7	22.0	1.6	1.5
Significant at <0.05					

Significant at  $< 0.05$

**NCAF total:** There was no significant difference in the NCAF total of the eight and thirteen month feeding episode in the depressed group. The mean of the eight month

NCAF total was 62.7 and the mean of the thirteen month NCAF score was 61.5.

**Control group:**

**Parent score:** There was not a significant difference between age groups in the parent subscales sensitivity to cues, response to distress, and social emotional growth fostering or in the parent total. However, in the subscale cognitive growth fostering there was a significant improvement in the mean score from eight to thirteen months. The mean score at eight months was 7.6 which improved to 8.3 by thirteen months ( $t = 3.0, p < .02$ ). Table 12.

**Table 12: Comparison of the parent subscale and total scores between ages in the non depressed group**

NCAF subscale	Non Depressed group n=8				t value
	8 month		13 month		
	Mean	SD	Mean	SD	
Sensitivity to cues	10.6	2.2	11.9	2.2	1.05
Response to distress	7.6	1.6	7.6	2.8	.17
Social emotional growth fostering	11.6	1.4	11.4	2.6	.42
Cognitive growth fostering	7.6	.92	8.4	.92	3.0*
Parent total score	37.6	4.2	38.0	8.3	.88

\* Significance level of  $< 0.05$

**Infant score:** There was no significant difference in the infant subscales or infant total between the eight and thirteen month feeding episodes. Table 13.

**Table 13: Comparison of infant subscales and total scores in the non depressed group**

NCAF subscales	8 months		Non Depressed n=8 13 months		t value
	Mean	SD	Mean	SD	
Clarity of cues	12.8	2.1	13.6	1.5	1.1
Responsiveness to caregiver	7.3	1.2	7.1	.99	.31
Infant total score	20.0	3.1	20.8	1.9	.42

**NCAF total:** The NCAF total scores for the 8 month and 13 month control groups are 57.6 and 58.5 respectively. There was no significant difference found.

### Feeding Scores and Attachment Classification

#### Frequency of attachment classification

When analyzing the entire sample, 43.2% of the infants were classified as secure at thirteen months of age. In the depressed group, 42.1% of the infants were classified as secure. Of the infants whose mothers were in the non depressed group, 44.4% were classified as secure. Table 14.

**Table 14: Distribution of attachment classification in 13 month old infants**

Classification	Entire Sample n=37		Depressed group n=19		Non Depressed group n=18	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Insecure	21	56.8	11	57.9	10	55.6
Secure	16	43.2	8	42.1	8	44.4

**Hypothesis 4:** *Infants of depressed mothers with contingency scores below the mean will have insecure attachment classifications.*

In the depressed group, 5 dyads had total mother contingency scores that fell

below the group's mean of 10.7. Two of them were classified as securely attached and three were classified as insecure. In the control group, six of the dyads had total mother contingency scores falling below the control group mean of 10.1. Three of the infants were classified as secure and three as insecure. Table 15. Therefore, there was no data to support hypothesis 4.

**Table 15. Comparison of mothers' contingency score and infant attachment classification**

	Depressed Mean = 10.7, SD= 2.4			Non Depressed Mean = 10.1, SD = 3.2		
	# Below Mean	Secure	Insecure	# Below Mean	Secure	Insecure
13 month olds	5	2	3	6	3	3

#### **Mothers' contingency score, attachment classification, and gender**

**Hypothesis 5: Sons of depressed mothers with contingency scores below the mean will be more likely than daughters of depressed mothers with contingency scores below the mean to be classified as insecure.**

When considering the entire sample of 36 dyads, the mothers with daughters had a higher contingency score than mothers with sons (10.86 versus 10.01); this difference however, was not significant. Table 16.

**Table 16. Mothers' contingency scores by gender of child**

<u>Sex of infant</u>	<u>n*</u>	<u>Mean</u>	<u>SD</u>
Girls	14	10.86	1.75
Boys	23	10.07	3.47

\* Number in sample



In the depressed group, all of the infants falling below the group mean of 10.7 were males. Two of the male infants were classified as securely attached and three were classified as insecure. In the control group, out of the six infants falling below the group mean of 10.1, five were boys and one was a girl. Three of the boys were classified as secure and two were not. The girl was classified as insecure. Table 17. Since not enough girls had scores below the mean, there was no evidence to link contingent responsiveness of the caregiver with attachment classification.

**Table 17: Comparison of mothers' contingency score and attachment classification by gender**

Gender	Depressed Mean = 10.7, SD = 2.4			Non Depressed Mean = 10.1, SD = 3.2		
	# Below Mean	Secure	Insecure	# Below Mean	Secure	Insecure
Boys	5	2	3	5	3	2
Girls	0	0	0	1	0	1

## **Chapter V**

### **DISCUSSION OF FINDINGS**

#### **Summary of study**

The purpose of this secondary analysis was to compare the interactive styles of depressed mothers and their infants to dyads involving non depressed mothers. The feeding episode offered a well rehearsed situation through which a professional could observe the interactive style of both individuals in the dyad. It was hypothesized that non depressed women would score higher on the NCAFS tool. Additionally, it was hypothesized that the ability of the mother to deliver contingent responses to the infant during the feeding episode would be related to the infant's attachment classification. Specifically, males of mothers with contingency scores below the mean would more likely than females to be insecurely attached.

#### **Discussion of Sample Characteristics**

The mothers and infants participating in the videotaped feeding episodes were recruited by the original investigator in the Washington DC area. The SADS was used to classify the mothers into the depressed or non depressed groups. The groups were approximately equal in size. The mothers in both groups were highly educated with a minimum of twelve years and the average of approximately 16 years of schooling. Many were professionals, such as lawyers and physicians, working outside the home, however fewer women in the control group were working. All of the mothers were married. All but one of the dyads were Caucasian and more than half of the infants were males.

### Discussion of Research Hypotheses

The findings from Chapter IV will be discussed in reference to the hypotheses generated from the theoretical framework outlined earlier.

**Hypothesis #1:** *Depressed mothers will score lower on sensitivity to cues, social emotional growth fostering, and cognitive growth fostering subscales.*

The results of the data analysis indicate that the depressed mothers in this sample scored better than the non depressed mothers. The only statistically significant difference occurred in the parent subscale, cognitive growth fostering, in the eight month cohort. Since the depressed mothers scored higher, which was opposite of the hypothesized direction, hypothesis #1 can not be accepted. Further examination of the nonhypothesized parent subscales revealed depressed mothers in the eight month cohort scoring significantly better in the response to distress category. The caregiver total scores for both cohorts, eight and thirteen months, were significantly better for the depressed when compared to the non depressed group.

There may be number of reasons the depressed women scored better than the non depressed. Maternal age and education were related to the cognitive growth fostering scores in the eight month cohort. However, the limited influence of maternal age and education in this situation leads this researcher to examine other possibilities. The first possible reason to consider relates to the accuracy of the depression diagnoses. Endicott and Spitzer (1978) report the test-retest reliability for the Depressive- associated features scale of the SADS as .88 with an internal consistency of Cronbach's Alpha .79. Therefore, the diagnosis of depression or non depression is almost certainly accurate.

Most of the depressed mothers in this study had a history of depression. Some individuals up to five previous episodes. Therefore, although it is unknown whether the depressed mothers were receiving treatment or what the state of their depression during the feeding episodes, this author assumes that the mothers were aware of their depressed state since they had a prior history. Perhaps the awareness of their depression alone influenced the mothers' ability to put more effort into their parenting. Moreover, a depressed mother may experience a concrete sense of purpose and meaning in her life with the birth of a child and therefore be more available and attentive. Interestingly, the majority of the studies discussed in the literature review reporting asynchronous interaction between depressed mothers and their infants were done during early infancy prior to eight months of age. It may be possible that the time of this study, eight and thirteen months of age, may represent a time when depressed mothers are more available and attentive to their infants. This ability to give attention and be available may take time to develop and then, perhaps wane over time. A more straight forward explanation may be that these highly educated depressed mothers were able to "perform" the appropriate acts of mothering in a lab situation but may not be able to maintain this interactive pattern for an extended period of time.

During the eight month feeding episodes the depressed mothers score significantly higher in the parent subscales response to distress and cognitive growth fostering when compared to the non depressed mothers. However, the significant difference between the two groups disappears by thirteen months of age. The non depressed group improved significantly in the cognitive growth fostering scale from 7.3 to 8.1. Therefore, it appears

that the non depressed mothers require additional discussion.

These mothers involved in this study were well educated, professional women. Yet, a higher percentage of depressed mothers worked outside the home compared to the control group. It appears that there was a significant influence of work status and depression on the eight month parent subscale cognitive growth fostering (significance of  $f = .05$ ). At the thirteen month feeding, the work status of the mothers did not appear to significantly influence the scores. However, in the eight month cohort, depressed mothers that were working may have been more emotionally available during the limited time spent with their infants. A mother's perceived loss of career status that can accompany motherhood may prove to be a risk factor for women who are highly educated and have professional careers. Further study is warranted on this issue.

There is some evidence that the emotional energy required during the feeding episode to meet the needs of the infant may be too demanding of a task for the depressed mother (Klehr et al., 1983). Maternal depression may not be the only situation that affects emotional availability. When comparing the mean total parent NCAF score for the non depressed group in this study to general population results available in the NCAST manual (Barnard, 1994), the non depressed group's mean falls below the mean total parent NCAF score for low educated adults. These low educated adults are considered an "at risk" population for poor parenting skills. In contrast, the mean total parent NCAF score for depressed mothers in this study were more closely related to the mean of the higher educated mothers reported in the manual. In this study high education in depressed mothers appears to offer protection against synchronous interaction. Therefore, as stated

earlier, more in-depth information is needed in order to define these groups by understanding the influence of other variables.

Additionally, there was no information available on the mothers' level of social support, parenting stress, recent life events, stability of their marital relationship, or risk for domestic violence. All of these may influence the mothers' emotional availability to the infant during any interaction.

Since the NCAFS tool is a binary system which measures the occurrence but not the frequency of behavior, the utility of this tool in measuring the interactive style of depressed mothers may be compromised. However, a more in-depth microanalysis of the interactive styles of this same group produced similar results (Hirose, 1995). Further research appears important. It may be that maternal depression itself is not as influential on the mother-infant interaction as the combination of the depression with other life stresses and maternal coping skills.

**Hypothesis # 2: *There will be no significant difference between the infant subscale scores and total score at eight and thirteen months in the depressed and non depressed groups.***

In both age cohorts, eight and thirteen months, there was not a statistically significant difference between the infant subscale and total infant scores in the depressed and non depressed dyads. Therefore, hypothesis #2 can be accepted.

However, when comparing the differences between the depressed and non depressed infants at the different time periods, there is a greater difference in score between the depressed and non depressed groups in the thirteen month feeding episode.

This is particularly evident in the infant subscale clarity of cues. The clarity of the infants' cues was greater in the depressed group. Since research indicates that young infants of depressed mothers imitate their mother flat affect (Cohn & Tronick, 1983), the disparity in this study's findings is interesting. However, the NCAFS does not score the type of cue the infant is producing and there is no way to know if the depressed group is scoring higher because they are giving off more cues or just more negative cues. Another possibility for the lower clarity of cues score in the non depressed group may be related to the lack of maternal response to the infant's cues. The maternal subscale scores discussed earlier indicated that non depressed mothers scored lower on their subscales than the depressed mothers. The lack of maternal responsiveness may have failed to reinforce the infants ability to give cues, therefore the infants scored lower in their own subscales. Whatever the explanation, further study may help clarify the reasons for these interesting results.

There is evidence that infants of depressed mothers are less positive and have harder to read cues (Hoffman & Drotar, 1991). The non depressed mothers in this sample may have had other life stresses that interfered with their ability to encourage their infants positive behavior and clear cues. Referring back to the theoretical framework guiding this study, child development is a function of the infant's characteristics, the environment, and the parent's characteristics and interactive skills. Thereby, the infants' inability to score higher on the NCAFS may be partially due to the inability of their mothers to score higher on the parent subscales.

**Hypothesis # 3:** *There will be no significant difference in the dyad NCAF scores between eight and thirteen months of age within the depressed and non depressed groups.*

The data analysis comparing age group scores within the depressed and non depressed groups identified no significant differences except for one infant subscale, clarity of cues, in the depressed group and one parent subscale, cognitive growth fostering, in the non depressed group. Since there are statistically significant differences in these subscales, Hypothesis # 3 can not be accepted.

The test-retest reliability has been established for the caregiver and is well respected in the research community. Though the test-retest reliability for the infant is less than for the parent. The reason for the lower test-retest reliability for the infant is similar to the reason the scores differed in this study. Infants have a better ability to give clearer cues as they get older. The disparity of the cognitive growth fostering scores in the non depressed group is more puzzling. Again information regarding the mothers' level of social support, parenting stress, life stressors, stability in their marital relationship, and risk for domestic violence may have assisted in resolving this disparity. Since the thirteen month scores showed marked improvement, it is possible that the mothers' life situations improved.

Although in the non depressed group the parent subscale sensitivity to cues did not show a significant difference between eight and thirteen months, there is an improvement in the score. This is an unusual finding in studies using the NCAST tool. Therefore, this data raises questions on the other life circumstances that were not controlled or tested for



in this study. Again the question of the importance of perceived career loss on parenting skills may be important here. Mothers may be resolving feelings of grief involving career changes by the end of the first year of parenting their new infant.

**Hypothesis # 4: *Infants of depressed mothers with contingency scores below the mean will have insecure attachment classification.***

The percent of infants with secure attachment was 43.2 in the entire sample and 42.1 and 44.4 in the depressed and non depressed groups respectively. Of the infants with contingency scores below the mean, three of the five infants in the depressed group were in the insecure attachment category. Although there were more infants in the insecure category, the small sample size limits the ability of these data to support this hypothesis. Therefore, hypothesis #4 can not be accepted or rejected.

The low rate of secure attached infants in both groups, especially the control group, is particularly troublesome. A non depressed, well educated mother and her infant would not typically be considered high risk for insecure attachment. Yet the group of control mothers in this study was at high risk. Therefore, it is critical to identify other risk factors, besides depression, that are predictive of secure or insecure attachment classification in dyads involving well educated career oriented women.

Egeland and Farber (1984) identified that secure attachment classification in high risk dyads at thirteen months of age may not be stable and may continue to be influenced by events affecting the mother specifically the stability of her partner relationship. It appears to be important in the group involved in this study to clarify the influence of the mother's work status on attachment classification. As mothers complete the transition

from career women to mothers, attachment classifications may be influenced. Therefore attachment classifications done at eighteen months may be more indicative of infant outcomes in these dyads.

The parity of the mother may have some affect on the attachment classification. Primiparous non depressed women were more likely to have securely attached infants than multiparous non depressed women. In the depressed group, multiparous mothers were more likely to have securely attached infants than primiparous mothers. Table 18. From the data in this study, it appears that infants in the non depressed group can tolerate lower NCAF scores before falling into the insecure attachment classification. Furthermore, the difference in the NCAF scores between the secure and insecure is less in the non depressed group than in the depressed group. The group of dyads with depressed primiparous mothers is the only group to demonstrate a significant difference in the NCAF scores between secure and insecure infants ( $t = 2.2$ ,  $p < 0.05$ ). The small size of the sample severely limits the generalization of this information. However, the mean NCAF scores from the non depressed multiparous and primiparous and the depressed multiparous mothers indicates a need to identify confounding variables that influence attachment classification.

**Table 18. Comparison of NCAF score in primiparous and multiparous mothers**

Attachment Class	Non Depressed				Depressed			
	Primips (n=7)		Multips (n=7)		Primips (n = 14)		Multips (n = 5)	
	$t = .10$		$t = .56$		$t = 2.2^*$		$t = 2.9$	
	Freq.	NCAF	Freq.	NCAF	Freq.	NCAF	Freq.	NCAF
Secure	6	58.0	1	65.0	5	68.4	3	60.0
Insecure	1	57	7	58.9	9	60.3	2	70.0

\* Significant at  $p < 0.05$

**Hypothesis # 5: *Sons of depressed mothers with contingency scores below the mean will be more likely than daughters of depressed mothers with contingency scores below the mean to be classified as insecure.***

Of the eleven infants in dyads where the mothers contingency score falls below the mean, only one was a female. Of the infants in the depressed group, all five infants falling below the mean were males. In the control group, five out of the six infants with maternal contingency scores below the mean were males. The limited number of females falling below the mean inhibits accurate analysis of the relationship between the contingency scores and attachment classification. This lack of data does not allow for the acceptance or rejection of hypothesis #5.

Although in the entire sample boys outnumbered girls by approximately 3:2, they outnumbered the girls by 10:1 in dyads falling below the mean contingency score. This is particularly troubling since boys' future outcomes in early school years appear to be more easily affected by the contingency of their mothers' responses than the outcomes of girls (Lewis et al., 1984). Synchronous interaction in infants appears critical for their future social and cognitive development. Yet the data analysis from this study places boys at higher risk for asynchronous interaction. Information regarding parenting stress of mothers with sons compared to parenting stress of mothers with daughters would be interesting. Do some mothers find it harder to parent boys than girls? If so, what parts of the parenting process are the most stressful? In addition, information comparing the rate of contingency scores with the mothers' perceived difficulty or temperament of the infant may provide further insight. One thought is for certain, the potential outcomes for the

child and society at large mandates a greater understanding of the reasons why boys are at greater risk for asynchronous interaction. Further research may either clarify or negate the findings in this study.

### **Limitations of the Study**

There are several limitations regarding the application of this study. First, information on the sample selection criteria was not completely available. Since the original researchers were not available, clarification was impossible. It can be assumed that the mothers who were recruited had to have at least a high school education and to suffer from depression or not to suffer from any known psychopathology. The infants all appeared well and it can be assumed that a healthy infant was part of the criteria. However, any other inclusion criteria remains unknown.

Second, information on the mothers depression level at the time of the feeding episode remains unclear. The Beck Depression Inventory was done, documenting depression levels on the day of the feeding, however the results were not available. In this study, the investigator conducting the secondary analysis assumed that the mothers in the depressed group were still experiencing depression and not receiving treatment during the recorded feeding episodes.

The data available to us was limited to the mothers' mental health status, age, parity, working status, and education. Yet other factors may have influenced the interactive style of the parent and infant. For example, there is no information on the mother's perception of her infant, parenting stress index, recent life changes, social support, marital stability, or risk for domestic violence. All of these factors can confound

the results. Without this information, complete interpretation of these results is limited.

### **Implications for Future Research**

The importance of mother-infant interaction during the first year of life is well documented. Additionally, maternal depression has been documented as having a significant effect on the synchrony of mother-infant interaction. Further research needs to focus on whether maternal education is as much a protective factor for depression in parent-child interaction as demonstrated in this study. However, obtaining information on the mothers' life circumstances such as social support, parenting stress, life events, marital stability, and risk for domestic abuse appears critical in order to fully understand the impact of depression itself.

Additionally, the percent of insecure attachment is high in both these groups. It appears important to relate how maternal careers in highly educated women who either work or desire to work affect the attachment relationship between them and their infants. Is the attachment relationship different in these dyads?

Furthermore, research evaluating the effect of depression on parent infant interaction across several contexts is important. The influence of depression may be expressed more clearly during teaching episodes or free play time. Comparison of mother infant interaction during feeding episodes, teaching situations, and free play may clarify which situation, if any, is best at identifying depressed mothers at risk for ineffective interactive styles. In examining the influence of parental depression on these situations, concurrent mood on the day of the testing is important.

It has been suggested that by enhancing the mother-infant interaction, maternal

depression can be abated (Cramer, 1993). It appears important to not only document the effect of depression on maternal infant interaction but also the effect of maternal-infant interaction on depression.

### **Implications for Practice**

Recognizing maternal depression in the postpartum period is critical for all health care providers. If mothers are aware of their depression and its effect on their mother-infant relationship and their infant's development, they may be more motivated to either seek treatment or to improve their interactive style. It appears that a highly educated mother may be able to adapt to her infants needs despite her depression. Therefore, by recognizing maternal depression health care providers can direct their professional teaching and guidance to address issues that may be most relevant to a dyad with a depressed mother. However, the results from this analysis support the importance of the pediatric health care provider recognizing the multifactorial influences on mother infant interaction and subsequently on the mother infant relationship. In other words, mothers who do not appear depressed may actually be at risk for altered mother infant interaction styles due to other factors. Therefore, recognition of maternal depression as a risk factor for the child is only part of comprehensive pediatric care.

All mothers, even those not demonstrating depressed affect, should be screened for additional stress factors. These may include their level of social support, parenting stress, stability in their marital relationship, and risk for domestic violence. Depressed mothers who are identified and referred for treatment may be automatically screen for additional risk factors and offered services where as mothers not identified may miss a screening for

additional risk factors and therefore not be offered services.

Furthermore, the high rate of insecurely attached infants in both groups is particularly concerning yet it provides additional evidence that universal multidimensional screening of risk factors that influence parenting is essential. This study may be identifying a new “high risk” mother infant dyad; those mothers who are career oriented and give up part or all of their career for motherhood. The effects of a mother’s working or desire to work may have important implications on her attachment relationship with her infant. These dyads are not typically identified as needing additional support or services during the infants’ first year of life. Yet this study has indicated that these mothers and infants may be at risk. Future research is essential to clarify these results.

The importance of screening for psychosocial risk as well as for physical risk for disease is clearly supported by the findings of this study. From the rates of insecure attachment classification reported here, these infants are at risk for child abuse and neglect from parents, behavioral difficulties, and attachment disorders later in life. Yet as a profession, nursing is still challenged to develop a clinical protocol which can accurately and quickly screen for high risk mother infant dyads by taking into account multifactorial maternal and interactive variables.

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# NCAST FEEDING SCALE

Birth to One Year Only

Information applies to parent only

Mother's Ethnic Heritage (See back page)

Marital Partner Status ☐ Married ☐ Single

## Appendix A

Person Observed ☐ Mother ☐ Father ☐ Other

Major Caregiver ☐ Yes ☐ No

Type of Feeding ☐ Breast ☐ Bottle ☐ Solid

Usual Feeding Time ☐ Yes ☐ No

Length of Time Feeding (circle minutes)

10 or Less 10-20 20-30 30-40 30 or More

Setting

☐ Home

☐ Clinic

☐ Other

Were Others Present?

☐ Yes

☐ No

If yes, specify

Child's Name

Child's Age (in months)

Child's Sex

Child's Birth Order (circle)

1 2 3 4 5 or More

Child's State at Beginning of Feeding (circle)

Quiet Sleep Active Sleep Drowsy

Quiet Alert Active Alert Crying

### I. SENSITIVITY TO CUES

YES NO

1. Caregiver positions child so that child is safe but can move his/her arms.		
2. Caregiver positions child so that the child's head is higher than hips.		
3. Caregiver positions child so that trunk-to-trunk contact is maintained during more than half of the breast or bottle feeding (50%).		
4. Caregiver positions child so that eye-to-eye contact is possible.		
5. Caregiver's face is at least 7-8 inches or more from the child's face during feeding except when kissing, caressing, hugging, or burping the child.		
6. Caregiver smiles, verbalizes, or makes eye contact with child when child is in open-face-gaze position.		
7. Caregiver comments verbally on child's hunger cues prior to feeding.		
8. Caregiver comments verbally on child's satiation cues before terminating feeding.		
9. Caregiver varies the intensity of verbal stimulation during feeding.		
10. Caregiver varies intensity of rocking or moving the child during the feeding.		
11. Caregiver varies the intensity or form of touch during the feeding.		
12. Caregiver allows pauses in feeding when the child shows potent disengagement cues or is in the pause phase of the suck-pause sequence of sucking.		
13. Caregiver slows the pace of feeding or pauses when child shows subtle disengagement cues.		
14. Caregiver terminates the feeding when the child shows satiation cues or after other methods have proved unsuccessful.		
15. Caregiver allows child to suck and/or chew without interruption.		
16. Caregiver only offers food when the child is attending.		
TOTAL YES ANSWERS		

### II. RESPONSE TO CHILD'S DISTRESS

Yes No (Potent Disengagement Cues Observed)

17. Caregiver stops or starts feeding.		
18. Caregiver changes the child's position.		
19. Caregiver makes positive or sympathetic verbalization.		
20. Caregiver changes voice volume to softer or higher pitch.		
21. Caregiver makes soothing non-verbal efforts.		
22. Caregiver diverts child's attention by playing games, introducing toy, or making faces.		
23. Caregiver avoids making negative verbal responses.		
24. Caregiver avoids making negative comments to home visitor about child.		
25. Caregiver avoids yelling at child.		
26. Caregiver avoids using abrupt movements or rough handling.		
27. Caregiver avoids slapping, hitting, or spanking the child.		
TOTAL YES ANSWERS		

### III. SOCIAL-EMOTIONAL GROWTH FOSTERING

YES NO

28. Caregiver pays more attention to child during feeding than to other people or things in the environment.		
29. Caregiver is in "en face" position for more than half of the feeding.		
30. Caregiver succeeds in making eye contact with child once during feeding.		
31. Caregiver's facial expression changes at least twice during feeding.		
32. Caregiver engages in social forms of interaction (plays games with child) at least once during the feeding.		
33. Caregiver uses positive statements in talking to child during the feeding.		
34. Caregiver praises child or some quality of the child's behavior during the feeding.		
35. Caregiver hums, croons, sings or changes the pitch of his/her voice during the feeding.		
36. Caregiver laughs or smiles during the feeding.		
37. Caregiver uses gentle forms of touching during the feeding.		
38. Caregiver smiles, verbalizes or touches child within five seconds of child smiling or vocalizing at caregiver.		
39. Caregiver avoids compressing lips, grimacing, or frowning when making eye contact with child.		
40. Caregiver avoids slapping, hitting, shaking, or grabbing the child or child's extremities during the feeding.		
41. Caregiver avoids making negative comments or uncomplimentary remarks to the child or home visitor about the child or child's behavior.		
TOTAL YES ANSWERS		

### IV. COGNITIVE GROWTH FOSTERING

42. Caregiver provides child with objects, finger foods, toys, and/or utensils.		
43. Caregiver encourages and/or allows the child to explore the breast, bottle, food, cup, bowl or the caregiver during feeding.		
44. Caregiver talks to the child using two words at least three times during the feeding.		
45. Caregiver verbally describes food or feeding situation to child during feeding.		
46. Caregiver talks to child about things other than food, eating, or things related to feeding.		
47. Caregiver uses statements that describe, ask questions or explains consequences of behavior, more than commands, in talking to child.		
48. Caregiver verbally responds to child's sound within five seconds after child has vocalized.		
49. Caregiver verbally responds to child's movement within five seconds of child's movement of arms, legs, hands, head, trunk.		
50. Caregiver avoids using baby talk.		
TOTAL YES ANSWERS		